

COMMERCIAL VEHICLE OPERATIONS

Introduction

Technologies geared to improve commercial vehicle operations (CVO) allow thousands of trucks traveling on Arizona highways to safely deliver goods to businesses and consumers. Advance notice of adverse weather conditions and improved communications with dispatchers are some of the methods that ITS is improving commercial vehicle operations. ITS technologies are working in Arizona to improve carrier operations, enhance driver safety, streamline paperwork, and allow enforcement agencies to operate more efficiently, and increase revenues.

Commercial vehicles in Arizona are required to have their weight, registration, safety records, and other credentials checked as they pass through the 22 ports-of-entry (POEs) at state borders, including six international ports that border with Mexico. Any delays can cost truckers valuable time and money. ADOT has implemented the PrePass program to electronically verify safety and cargo records for drivers, vehicles, and carriers as trucks pass through the POEs at highway speeds without stopping. Weigh-in-motion (WIM) systems allow regulatory agencies to verify a vehicle's weight using scales installed in the roadway that measure the truck's axle and gross weight as the vehicle travels at highway speeds. Transponders located inside the cab send information about the truck's weight, cargo registration, and other credentials to the POE agents. The PrePass transponder displays a green light to those vehicles with proper credentials to bypass the weight station. If weight or credentials could not be verified, truckers receive a red light, instructing them to pull into the weight station for inspection. ADOT has implemented PrePass on Interstate Highways 8, 10, and 40 at state borders.

In addition to the PrePass, ADOT and FHWA have implemented a major project called Expedited Processing at International Crossings (EPIC) at Nogales POE, which combines proven ITS technologies to provide a carefully crafted blend of expedited processing, compliance monitoring, and traffic management. The ITS features, which assist the Nogales port-of-entry compound, include some expansion and integration of the existing technologies, as well as introducing some new technological enhancements. These technologies provide additional information on the current commercial vehicle status and historical data to the compound personnel. The data gathered in the compound will be stored in a database for real-time and future referencing. This information will be accessible through a shared local-area network (LAN), which will be available to the authorized users from several agencies located within the compound.

The technologies include the slow weigh-in-motion (SWIM) system, closed-circuit TV (CCTV) monitoring system, automated vehicle identification (AVI) system, variable-message sign (VMS), digital imaging equipment, database system for storage and integration of information from all of the technologies, communications system, and ancillary equipment. The EPIC also provides a means to access and update information from motor carrier services records. A brief description of each of the ITS elements in EPIC are provided below.

Slow Weight-In-Motion (SWIM) System

This system is the first ITS component that a commercial vehicle will encounter when entering the compound from Mexico. This device will weigh the vehicles as they enter the Drug Screening Area (DSA). Presently, there is no method of identifying and associating the vehicle to the weight after it leaves the DSA. The EPIC system integrates and stores the information from the SWIM with information from AVI, and/or other electronic instrumentation that will aid in linking the weight to the vehicle.

Closed-Circuit TV (CCTV) System

Closed-circuit cameras installed at various locations within the federal-state complexes allow the personnel to monitor the movements of the commercial vehicles and their operators, as well as to view and monitor various locations within the compound.

Automated Vehicle Identification (AVI) System

This system allows all the data, which is gathered throughout the compound, to be linked to the proper vehicle and driver. The AVI system is capable of reading the tags of the tractor, trailer, and driver, thus identifying the location of the vehicle in the compound. The first AVI encountered, when entering the U.S. from Mexico, is at the DSA. This location allows the vehicle's current weight from the SWIM to be available to personnel elsewhere within the compound. Each of the U.S. Customs booths has an AVI detection zone. These zones assist the personnel in these booths with any information contained in the EPIC system on vehicles' current border crossing and historical information.

Variable-Message Sign (VMS)

The VMSs installed within the compound to assist with the traffic management and control and to provide relevant information to the commercial vehicle drivers. The principal information to be displayed by the VMSs is to direct the drivers to the proper inspection station, as well as to provide the final clearance message. The VMSs are used in conjunction with the AVI system to display the destination of the vehicle approaching the sign.

Digital Imaging Equipment

This equipment is used to capture images of the vehicles and drivers as they are tagged. These images are stored in the EPIC system database for each vehicle and allow visual confirmation as the vehicle approaches any booth or inspection station.

A separate digital imaging function is also utilized in the inspection of vehicles. This automated equipment would capture a digital image of the U.S. DOT vehicle numbers and the wheels—specifically the lugnuts of each axle of a vehicle passing this equipment.

Database System

The database system stores all of the data gathered in the compound. This system identifies vehicles for inspections through various strategies, including selected, random, and queuing-based strategies. The system identifies the vehicle approaching a VMS and displays the inspection station, which is to inspect the vehicle. Inputs to this database are from various electronic and keyed-in entries. This system has many real-time and historical reporting functions.

Communications System

The communications system, over which the referenced ITS components must rely, is of fiber-optic and twisted-pair copper cables, placed in underground conduits. The communications infrastructure will be connected to the LAN system between buildings. The communications equipment will also include ITS field controllers and cabinets.

Peripheral and Ancillary Equipment

Peripheral and ancillary equipment, which support the LAN network, include PC-based workstations, hubs, servers, and media converters.

Goal

The goal of the proposed EPIC system is to enhance the overall efficiency and effectiveness of commercial vehicle border-crossing operations at Nogales POE, and to reduce the impacts on institutional and legal barriers.

Objectives

- Implement electronic and high-tech commercial vehicle processing systems.
- Deploy advanced traffic management systems.
- Provide information dissemination systems for vehicle and driver.